



Heel Pad - Floor Applications

1 Scope

1.1 Material Description. The material shall be constructed using polyvinyl chloride or thermoplastic polyolefin polymers compounded for wear resistance and adhesion compatibility to carpet pile. The material shall be integrally colored.

1.2 Symbols. A unique finish symbol will be given to each construction by the responsible GM representative at initial development.

1.3 Applicability. This specification describes materials that are suitable for use as heel pads attached to floor carpeting.

1.4 Remarks. For requirements for vehicles without solar absorbing glass, contact the appropriate Materials Engineer. All interior materials are developed to be used in vehicles with solar glass; therefore, performance may be compromised if used in non-solar glass vehicles.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ISO 34-1	ISO 105-B06	ISO 527	ISO 5084
ISO 105-A02	ISO 105-X12	ISO 868	ISO/IEC 17025
ISO 105-A03			

2.2 GM Standards/Specifications.

GMW3059	GMW3221	GMW3417	GMW14444
GMW3182	GMW3232	GMW6992	GMW14864
GMW3205	GMW3235	GMW14162	GMW15634
GMW3208	GMW3402	GMW14270	GMW16853

2.3 Additional References. None.

3 Requirements

3.1 General Requirements

3.1.1 Requirements on Test Specimens. Reference GMW3221. All test specimens shall be conditioned to GMW3221, Code A, for a minimum of 24 h before and after completion of test unless the test method indicates that standard conditioning is not required.

3.1.2 Sampling and Test Specimen Preparation. All test specimens shall be taken from the area beyond the initial 1 m of production. Prepare test specimen as required in the respective test method. When multiple test specimens are required, they shall be tested parallel and perpendicular to machine direction to determine true minimum and maximum values for conformance to requirements of this specification. Avoid taking specimens from damaged, contaminated, or defective areas caused by improper handling or manufacturing. Specimens should not be cut within 50 mm of any edge of the sample.

3.1.3 Visual Evaluation of Automotive Trim (GMW6992). The color, pattern, aesthetics and other related qualities shall be evaluated and approved by the responsible engineering department as an acceptable match to the engineering approval sample when viewed under conditions set forth in GMW6992.

3.1.4 Deviation from Defined Test Methods. Deviations from the conditions of any test method shall have been agreed upon between supplier and vehicle manufacturer. All deviations shall be specified on the component drawings, material specifications, etc., and shall be indicated on test certificates, reports, trim transmittal, etc.

3.1.5 Certification of Test Data. Laboratory testing is to be performed by a laboratory that conforms (meets requirements, may not be formally recognized by a third party) to ISO/IEC 17025, or is acceptable to the customer (GM). Supplier shall submit a letter of compliance.

3.1.6 Material Construction Specification. All required information shall be reported on the Construction Specification Form provided in Appendix A, Data Sheet A1. A specification form shall be submitted along with each construction for engineering approval. Established values for a construction will be reported on and controlled within the limits established on the Construction Specification Form provided in Appendix A, Data Sheet A1.

3.2 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts.

3.3 All materials supplied to this standard must comply with GMW3059, Restricted and Reportable Substances, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.

3.4 Construction Requirements. Refer to the Heel Pad Construction Specification Form provided in Appendix A, Data Sheet A1.

3.4.1 Weight (GMW3182). Report the average of three (3) specimens in grams per square meter (g/m^2) to the nearest 0.1 g/m^2 . Refer to Appendix A, Data Sheet A1 for weight specification requirements.

3.4.2 Thickness (ISO 5084). Report the average thicknesses for three (3) specimens, in millimeters (mm) to the nearest 0.01 mm. Use a 2.0 N load and a 50.5 mm diameter pressure foot to achieve a pressure of 1.0 kPa. All readings should be taken after the pressure foot has been in contact with the material for at least 5 s. Acceptable production tolerance shall be $\pm 10\%$ unless otherwise specified on Appendix A, Data Sheet A1.

3.4.3 Tensile Stress at Break (ISO 527, Type 1A Dumbbell, 500 mm/minute). Test three (3) specimens for each direction (Flow and Cross Flow direction) and report the average. The minimum value shall be 12 N/mm^2 for Flow Direction, and 10 N/mm^2 for Cross Flow direction.

3.4.4 Elongation at Break (ISO 527, Type 1A Dumbbell, 500 mm/minute). Test three (3) specimens for each direction (Flow and Cross Flow direction) and report the average. The minimum value shall be 250%.

3.4.5 Tear Strength (ISO 34-1, Method B, 50 mm/minute). Test three (3) specimens for each direction (Flow and Cross Flow direction) and report the average. The minimum value shall be 65 N/mm .

3.4.6 Hardness, Shore A (ISO 868, 15 s Delay). Test three (3) specimens and report the average. The minimum value shall be 80 points ± 5 points.

3.4.7 Abrasion Resistance (GMW3208). Three (3) specimens per type shall be tested according to GMW3208. Heel pad materials must meet 500 cycles of wear, using CS10 wheels and 500 g load. The rating shall be 6 minimum.

3.4.8 Cold Flexibility. A 25 mm wide piece of heel pad must withstand a quick 180 degree flex around a 12.5 mm diameter mandrel at -20°C with no evidence of cracking.

3.4.9 Resistance to Odor (GMW3205). Report results for wet and dry conditions. Use a ratio of specimen size to container volume of 1:50. A rating of ≥ 6 is required.

3.4.10 Fogging (GMW3235, Method B). The condensable constituents, or the fogging value **G**, shall be ≤ 2 mg. No droplets, or crystals are acceptable upon visual examination.

3.4.11 Flammability (GMW3232).

3.4.11.1 After Conditioning (GMW3232). Immediately prior to tests all test specimens shall be conditioned for a minimum of 24 h according to GMW3221, Code A.

3.4.11.2 After Aging (GMW3232). In addition to tests conducted in the as received condition, all materials shall additionally be tested for flammability after the following artificial condition:

- The test cycle shall commence with $48 \text{ h} \pm 1 \text{ h}$ at $40 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$ and $93\% \pm 5\%$ relative humidity followed by $168 \text{ h} \pm 1 \text{ h}$ at $90 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$ and completed without interruption. Repeat conditioning before starting flammability test.

3.5 Color Requirements. Refer to the Heel Pad Color Certification Form provided in Appendix A, Data Sheet A2.

3.5.1 Colorfastness to Artificial Light. The procedure and requirement will be defined on the construction specification sheet or by approving region. A noticeable value (lightness) and/or chroma (saturation) change with minimum hue change is acceptable. The evaluation criterion for noticeable value change is a rating of 4 or better per ISO 105-A02 Grey Scale for Color Change. Evaluate specimens per conditions set forth in GMW6992. For each type, only one (1) test method is required.

Note: Xenon testing shall be performed and reported for limited approval status while Nature Weathering testing is ongoing. Natural Weathering is the requirement for full approval. See Tables 1, 2 and 3.

Table 1: Xenon Arc Method (GMW14162, Cycle A)

Application	Requirement	For Information
Heel Pad	320 kJ/m ²	640 kJ/m ²

Table 2: Xenon Arc Method (GMW14162, Cycle B)

Application	Requirement	For Information
Heel Pad	14 MJ/m ²	28 MJ/m ²

Table 3: Xenon Arc Method (ISO 105-B06, Condition Number 5)

Application	Requirement	For Information
Heel Pad	112 kJ/m ²	Not applicable

3.5.2 Natural Weathering Exposure (GMW3417). Evaluation criteria shall be no greater than a noticeable value (lightness) and or chroma (saturation) change with minimum hue change. Evaluate specimens per the condition set forth in GMW6992.

Note: Non solar glass vehicles revert to regional requirement. See Table 4.

Table 4: Xenon Arc Method (GMW3417)

Application	Temperature	Requirement (TNR kL)	For Information
Heel Pad	85 °C	15	Not applicable

Note: kL = kiloliters, TNR = Temperature Normalized Radiation.

3.5.3 Resistance to Sulfur Ion Staining (GMW14864). There shall be no yellowing or shade alteration after the following exposure:

- Sulfide: for 10 s
- Sulfur dioxide: for 25 minutes

3.5.4 Color Crock (ISO 105-X12). The requirement is a rating of ≥ 4 per ISO 105-A03 Grey Scale for Staining. Perform 10 strokes, fore and aft cycle, for both wet and dry.

3.5.5 Soil and Cleaner Resistance (GMW3402). Perform soiling Code A for all soils except codes E, L, and M; clean the specimen using Code 0, 1, 2, 3, 4 and 5 cleaners. For soiling (Part A) the minimum rating is 3. Rate the cleaned specimen using ISO 105-A02 Grey Scale for Color Change. For cleaner resistance (Part B), the